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Bathing facilities and habits of the soldiers...

[n.p.]

[1917]

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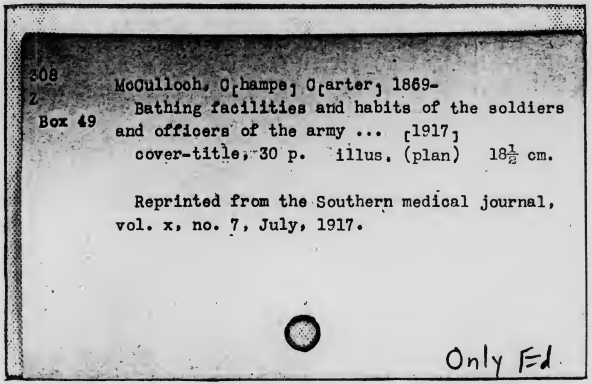

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DATE FILMED: 3-5-97 INITIALS: MS

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REPRINT FROM
THE SOUTHERN MEDICAL JOURNAL
Journal of The Southern Medical Association
Birmingham, Alabama
Vol. X JULY, 1917 No. 7
Pages 572-581

BATHING FACILITIES AND HABITS OF THE SOLDIERS AND OFFICERS OF THE ARMY*

By C. C. McCulloch, Jr., M.D.,
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Classical references to the bathing habits of soldiers seem, on casual investigation, rather far to seek. In the Odyssey, the feet of Ulysses are washed upon his return to Ithaca by his old nurse Eurycleia, who recognizes the wanderer by a scar upon his knee. This scene is represented in relief upon a marble *ex voto* now in the National Museum at Athens and on many Greek gems and vases. In another Greek legend, the hero Theseus, who, among other military exploits, fought with the Amazons, is compelled to wash his feet upon the brink of a narrow cliff overlooking the sea by a gigantic robber, Sciron, who dashes him into the water by tripping his foot.

*An address delivered before the American Association for Promoting Hygiene and Public Baths, at Pittsburg, Pa., May 8, 1917.

Theseus frees the land of the bully by throwing him from the cliff by one foot, or according to another account by knocking him on the head with his own iron foot bath.

"This be thy guide, O man of woman born,
Bathe well thy body at the break of morn;
But if ye would ablutions make complete
Neglect ye not that pair of precious feet;"

advice that would not come amiss to the present-day soldier.

A Greek vase in the Louvre depicts a scene which may have a bearing upon military hygiene. In the right upper quadrant we see the projecting feet of a youth; at the left is a figure of the attendant in the act of wringing out the sponge into the decorated foot bath which bears the stock inscription *"kalos,"* which might here be translated by the legend on some commercial products—"best by test." At the extreme left hang the youth's sandals, and the inscription *"erchetai"* tells us that "he makes himself ready for marching."—Sudhoff.

When, toward the end of their famous march, there burst forth from Xenophon's soldiers their involuntary exclamation, *"Thalatta, thalatta,"* let us hope that mingled with their natural delight at that manifest evidence of the approaching end of their so difficult campaign, there was at least in subconsciousness the hope of the early accomplishment of the (perhaps 'till then) unfulfilled desire of completely and thoroughly washing away

the distressing accumulations of the dusty and arduous parasangs that they had lately marched. However, it has been said that the Greeks regarded too frequent baths as a mark of effeminacy.

The so many eloquent remains of Roman baths and aqueducts, speaking as they do of the love of cleanliness of that noble race, lead us to suppose that in their armies as well as at home they must have devised some effective means of bathing and of personal hygiene. Seyffert relates that the Romans were so fond of the bath that if the emperor or a rich citizen presented the people with a free bath for a day, a longer period, or in perpetuity, he won the credit of exceptional liberality.

In the middle ages, with their prevalent epidemics of plague, and typhus, and dirt diseases, particularly in armies and in campaigns and wars, we must conclude that the adequate practice of personal cleanliness could not have been at all widespread.

Coming down to more modern times, however, one is gratified to find that in Headley's "Napoleon and His Marshals," the well-known book of our boyhood days, there is a plate entitled "Toilet of the Guard," representing the members of the famous Old Guard in the act of performing their ablutions. Still more recent French pictures and photographs show the use of the effective device of turning a hose frankly upon the naked enlisted

men in the wash room of the barracks, an expedient which might be utilized in the field even now where water pipes have been laid in, but where shower baths and convenient pools of water are not available. Thus a stream of water from a simple garden hose ought to be very effective in cleansing the body, especially its hairy portions, and would no doubt afford a refreshing and even humorous diversion for the men. The tales we have all heard from the returned heroes of the Civil War, both Union and Confederate, in regard to the general prevalence in their camps and prisons of the famous "gray backs" certainly lend weight to the idea that their methods of personal hygiene and bathing and washing of clothing were in those days far from adequate.

Taking up the bathing habits and methods in vogue in armies prior to the outbreak of the present European War, I was truly astonished to find, as the reader will no doubt also be, that the situation in reference to the English Army was described as follows by a well-known Brigade-Surgeon of the British Army in a lecture at the Royal Artillery Institution. True, this was delivered in 1894, and conditions, no doubt, were much improved in the next twenty years. He said that he could not exaggerate the defective condition as regards cleanliness of the person of the British soldier. A man comes up before his officer well dressed and well turned out, but he is a whited

sepulchre, for the condition of his person and the odor that comes from him are very unpleasant. This odor, this *esprit de corps* in the very worst sense, which comes from the body of the soldier is most offensive; if any one will come over to the auxiliary hospital in the morning he will have a smell like the odor of a troop ship in the Red Sea. He says that from October 15 to April 15 all bathing ceases in some garrisons and the body of the soldier is not washed at all. He says that this comes before the doctor in the most striking way, that he has to examine the chest and the odor is most trying—that cubic space is based on the clean man, but you have this man going to bed in the barracks room with his body not washed, so that the air becomes offensive and tainted, and this affects the health, the fitness and in the end the discipline of the soldier. This condition was attributed by the author to an insufficient allowance in the Army Regulations of bathing fixtures for the soldiers; this was 1 %, and undoubtedly much too little. (We allow at least 6 %.) One doubts, however, if this is a sufficient explanation; it would seem, indeed, that such habits in the Army must merely be a reflex of those that prevailed in the class of the population from which the British regular soldier was drawn.

It had really never occurred to me that there could be such a wide discrepancy between the bathing customs of the Eng-

lish officer, whose exaggerated cleanliness is proverbial, and the private soldier, Tommy Atkins.

I am indeed glad to assure the members of the Association for Promoting Hygiene and Public Baths that no such differences exist in the American Army, but that our conditions and habits in this respect have been for years past what I should term highly satisfactory, both from the hygienic and esthetic standpoints. Practically all our modern Army posts have installations of water and sewer systems, and in connection with each set of company barracks there is situated, usually in the basement, though sometimes detached in the rear of the building, a completely equipped lavatory with adequate bathing facilities. The former arrangement is quite satisfactory, provided the plumbing system is good, and lends itself to convenience and economy, especially in heating. In the later installations, the shower bath is used instead of the tub method, which is insanitary as well as inconvenient and expensive, and also requires a much greater expenditure of water.

I can say, and I think without exaggeration, that the daily bath is now the almost universal custom of the soldiers in the United States Army. I am speaking here, of course, of life in barracks in time of peace. There is indeed a sort of *esprit* in the average company which requires the recruit, who may not thoroughly appreciate the advantages of personal cleanliness, to adapt himself quickly to the more strenuous habits of his comrades under pain of personal unpopularity and even social isolation.

These splendid results along this line are due, I have no doubt, to the unbounded energy and preachment in and out of season of the doctrines of personal hygiene by Woodhull, Hoff, Havard and others of our distinguished Army sanitarians of the old school, now unfortunately retired from active service. Havard is particularly happy in his style, his "Manual of Military Hygiene" being *facile princeps* among the many works that have been written upon this subject. It is scientific, thorough, and up to date.

Havard says that we bathe and wash the skin (1) to promote and stimulate its physiological functions of excretion; and (2) to remove dirt and prevent the breeding of germs on its surface. This point is of particular importance in the crowded conditions of barrack and camp life in connection with the liability to the propagation of infectious diseases by personal contact. A notorious case in point is that of the spread of typhoid fever in our home camps in the Spanish War times. Much of this disease incidence, according to the Vaughan Board, might have been prevented by the application of more careful methods of personal cleanliness. (3) To prevent fouling of the surrounding air by accumulated filth. (4) For the tonic

and stimulating effect of cold water upon the nervous system.

Havard recommends for the soldier the general shower bath, daily when possible, but at least twice a week, individual soap, preferably of a kind approximately neutral in reaction, and the individual towel. The feet, at least, should be bathed daily in cold water, and their care is of great importance in the field, especially on getting into camp after the march. The hands should be washed, preferably in running water, before eating and after defecating.

"While bathing, the soldier should give special attention to the hairy parts of the body, under the arms and about the genitals and anus. The secretions from the mucous membrane of the prepuce, particularly in men with long foreskin, soon become acrid and irritating and should be regularly washed out. In such cases, circumcision is often advisable. The skin around the anus, as well as the anus itself, especially in case of hemorrhoids, must also be thoroughly cleaned."

In the field, also, our American army habits in this respect are quite satisfactory in time of peace. In our semi-permanent camps it is the custom to lay in a piped water supply and erect the Army Regulation field lavatory. This, for one company, is a knock-down building 25 feet in length by 8½ feet in width, and contains five simply constructed shower baths and one wash sink ten feet long with four faucets. When necessary, more simply constructed

sheds may of course be improvised. On the Mexican border Major Saville, of the Quartermaster Corps, devised a satisfactory apparatus for heating the water for field baths. He used a thirty-gallon boiler with three-fourths-inch galvanized iron pipe coils, the latter set in a simple brick furnace, all being covered over with adobe to conserve heat.

Again quoting Havard:

"The men should not only bathe themselves, but also wash their linen whenever the opportunity offers so that it may always be as fresh and clean as conditions permit. Then not only will they save themselves and comrades from possible contamination by germs of typhoid fever, cholera or dysentery, but in case of a battle they will be much less likely to suffer from wound infection, for this dangerous complication very seldom results from the slender, hard bullet of the modern rifle, but almost always from dirty skin and clothing. The hands are the most dangerous agent of disease transmission in camp, and therefore must be frequently washed."

In camps where there is no piped supply, it is sometimes practicable for the soldiers to bathe in a near-by stream, always, of course, below the source of the water supplies. Again, shower baths are improvised. A very satisfactory one can be made with a five-gallon oil can with small nail holes punctured in the bottom, a simple handle of some kind attached and the whole apparatus suspended by a rope over a tree limb or a beam, after being filled with water. The English have devised a simple framework to hold

these tins, including a sloping wooden floor and trough to drain off the water. Officers often use folding rubber bath tubs. Tin tubs of various shapes and sizes, of course, gradually accumulate in a semi-permanent camp. The only difficulty with these methods is of course the transportation of sufficient water. The disposal of the waste water from these extemporized bathing places is, by the way, a sanitary matter of considerable importance in large camps. The method found most satisfactory on the Mexican border was to collect the sullage water in large pits which were pumped out at intervals by the so-called "odorless excavator."

To repeat, in my opinion there is no particular problem requiring solution in regard to the bathing facilities and habits of our soldiers in barracks or in camps in time of peace. That is the main point, I imagine, in which this Association is interested in this connection. If I have enlarged upon some of the elementary truisms of personal hygiene, it has been with the idea in mind of a prospective large expansion of our military forces, which must consist in their early stages of large collections of untrained troops who must learn, among many other things, the very important matter of taking care of themselves and their personal health in camp. Such troops often fail to apply the simplest rules of hygiene, as they did even so late as in the Spanish-American War.

The answer to this problem is, to my mind, intensive, thorough military training carried out over a sufficiently long period of time,—I should say approximately a year.

Since the Civil War we have had in this country no experience with the mobilization of very large bodies of troops, nor with such conditions as are now operating in the trench warfare abroad.

I think, therefore, that the most instructive thing we can at present do in regard to the study of the question of bathing in the Army is briefly to review some of the methods that have been adapted in the foreign armies to the peculiar circumstances of the present war and to the necessity of handling such large bodies of men. We may, before the war is over, have similar problems of our own to solve, and forewarned is forearmed. It is just as well to begin to think over these details now, before the necessity to employ them has arisen, certainly better than to leave their study to a time when they will be forced upon us suddenly and without preparation by some kind of big epidemic or other plague.

If you have not previously read of it, you will perhaps be surprised to learn that of all the nations engaged in the world war, the Russians first attempted the solution of this question of bathing troops by wholesale, and judging from the available literature, have, since the beginning of the war, paid it the most attention.

Indeed, it is stated, and by a reliable French writer, that in the first weeks of the present war, the Russians had sent to the front thirty trains of comfortable "rolling baths," as he calls them. This is hard to believe, and I do not find the statement confirmed in other literature, but it is possibly true, judging from the well known habits of personal cleanliness of the Russians, even the lower classes.

Wherever the troops are conveniently situated with regard to a railway line, that is, where they are not operating in advance of the railhead, there is no doubt that these bathing trains offer the best possible solution of the difficult problem of bathing large numbers of men quickly. They are invaluable, but their zone of operation is limited. It must not be forgotten, in this connection, that owing to the presence in Europe of typhus fever, and to the peculiar conditions of the modern trench warfare, any effective plan for bathing troops on a large scale must also include means for the disinfection of vermin-infested clothing.

Various bathing methods have been devised for the troops during the progress of the war, some of them showing much ingenuity.

I shall first describe briefly a few of the more practicable Russian improvisations as described in the *Voyenno-Meditsinskiy Jurnal,* Petrograd, 1915-16.

I. V. I. Barbarin has expressed his "deep conviction of the usefulness" of what we may call the *hut method* of bathing soldiers, as modified and employed by him among the Russian troops in frontal positions. A peasant's hut is *rented* (note the contrast with German economic methods in France), preferably with two rooms, one being used for dressing. In the bath room are set up two iron stoves, each consisting of a furnace and a tank of about 13.5 gallons capacity. Serpentine iron stove pipes furnished with ribs to increase the heating surface lead out of the stoves. When practicable to carry it, a boiler of forty to fifty gallons capacity is added to the installation. Barrels for extra heated water and for cold water (also rented in a near-by village) and pails from the quartermaster stores are supplied. The packing boxes for the apparatus may be used for improvising benches and shelves. Water is generally obtained from a well in the adjacent yard and soldiers are sent out in advance to cut wood for fuel. The room is heated by pouring water over the red hot stove pipes. Water can be made ready within thirty to forty minutes after setting up the apparatus. When economy is necessary, each man is allowed about 2.7 gallons of water for a bath, and this small quantity had led to no complaints. About 700 men can be bathed per day. The soiled linen is put in bags and boiled, mended and dried by washerwomen in a

neighboring village, eight of whom can do about 200 suits per day. Boiling of the clothing is necessary to destroy the vermin. This system, and indeed any other that is really effective, obviously requires reserves of fresh linen to be on hand for issue at the bath. Each stove weighs about 650 pounds and the apparatus for two such baths as above described can be transported on one wagon. They are usually set up about three kilometers from the firing line. The main objection to this hut method is that it does not handle a large enough number of men in a given time.

The idea has been expanded, especially by the English, in suitable places, by taking over empty manufacturing plants and practically remodeling their rooms, and vats, and boilers, and water systems, into bathing and disinfecting pavilions. When possible, this is of course a most satisfactory as well as economical method. Dr. George Vitoux, in the *Revue d'Hygiene et de Police Sanitaire* for 1915, describes a substitute for the hut method that has been practically applied at the front, even in the trenches themselves. A pit is made of about six meters in diameter, paved with brick gathered up from the sites of demolished houses, all covered over with a sheet-iron roof on which earth is spread and the sod transplanted. On the roof a large tub is placed which has four outlets with stopcocks at the bottom which communicate through the roof

with four sprinklers for shower baths. Under each of these is placed a tub. Beside the tub on the roof there is installed a boiler for heating the water. In the bathing apartments a stove is placed for heating. Everything necessary for an installation of this character can be improvised—some tubs or hogsheads sawed in two, some pieces of piping, sprinklers of watering pots obtained in a neighboring village, a few men and a professional plumber from the troops, and the apparatus is easily and quickly constructed.

Dr. J. J. Matignon, of the French Army, has invented a clever device, when there is a stable handy. He asks what is really absolutely necessary for bathing and answers three things only: (1) a warm place; (2) warm water; and (3) receivers. For the hot water he used the rolling kitchens recently adopted for the Army, each of 500 liters capacity and which permit of hot water being supplied at will and everywhere. As receivers he used tubs made by barrels cut in two, and for the warm place a stable containing a number of horses, the atmosphere being rendered sufficiently warm by what he terms the "central animal heat." The place and the necessary paraphernalia being found, a certain number of horses, say ten, are taken out and the improvised tubs are put in their places on the straw bed, which is first covered with a sort of latticed framework made up of brush to protect the feet of the

bathers. The rolling kitchen is placed behind the door, all the exits of the stable are carefully closed to conserve the heat and shut out currents of air, and the bathing seance is ready to begin. Men in groups of ten enter, with soap and towels, and undress, and each one stands in a tub. Two men from the stretcher bearers pour the suitably heated water over the backs of the bathers from ordinary watering pots. Squatting down in the tubs, the men soap themselves over and then receive a second sprinkling. The whole operation can be performed in five or six minutes — about one hundred men can thus be bathed in an hour with a minimum quantity of water. The method, while it works well, is faulty of course in that it can only be applied in certain localities.

II. S. I. Ignatyeff, to revert to the Russian methods, criticises the *hut* as allowing too little room, and as generally not providing sufficient drainage, and says the requisite conditions for the field bath are:

1. Portability and simplicity of construction;
2. Possibility of rapid heating (i. e., in one or two hours);
3. Free drainage away of the water used in bathing;
4. Possibility of the simultaneous bathing of at least 15 men;

and claims these are satisfied by what is known as the *tent bath.*

A circular tent is set up near a source

of adequate water supply, a ditch being dug through its site for drainage purposes. The earthen floor is covered with straw (except near the stove). In one end of the tent is then placed an iron stove costing from three to five dollars in the small provincial towns, which has a long stove pipe leading out of the tent by two right-angled bends. A traveling company kitchen, filled with water, is brought in and its pipe led out through an opening. Cold water is supplied in any convenient receptacle. When put in operation, two or three companies of 150 men each can be bathed in a day. The straw bed catches the lice, and is removed and burned after the company has washed. The necessary apparatus is easily carried on a wagon.

III. V. A. Brink describes the more complicated and ambitious, but still practical *traveling bath* of the Sanitary Detachment of the Eighteenth Army Corps. He had conceived the desiderata of an effective bath to be as follows:

1. Simultaneously with the bathing, the enlisted men should also have their hair cut, and their clothing and linen disinfected and freed from insects.
2. The rapidity of passage through the bath should be not less than 100 men per hour, thus making it possible to wash a company—the Army unit—in a small interval of time.
3. The plan of the bath should be such that those who have been bathed should not come in contact with those who have not yet been bathed. In other words, the bath should be divided into soiled and clean halves.

4. The water used in bathing should be collected on a floor which can be dismantled and removed by disconnectable pipes.
5. The bath should possess great mobility, and the possibility of being set up in any convenient place.
6. The bathing pavilion should be provided with sufficient heat both for the air and for the floor.

Dr. Brink was furnished the opportunity by private means to construct a bath designed to carry out these ideals, and the military authorities supplied the men for its operation.

A large circular tent of about 23 yards in diameter is set up and in the center of this a smaller tent, the bath proper. In the space between the two tents a circular canvas wall is suspended on uprights, dividing this space into two circular corridors, an external and an internal one. In the external corridor are placed the anteroom of the disrobing chamber, the sterilization room with portable disinfecting apparatus, the anteroom of the dressing chamber, and the laundry with laundry machine for washing towels, etc. In the internal corridor are placed the undressing chamber, the barber shop, the distributing room for soap and bast-wisps, with an entrance door into the bathing tent, and the dressing room with doors leading out of the bathing tent, fenced off with compact transverse partitions from the undressing and distributing rooms. The arrangement described thus realizes the desired division of the bath into soiled and clean parts.

In the central bathing tent there is placed a floor of corrugated sheet iron in two semicircular halves, inclined toward the center, which may be taken apart. In the middle is laid a disconnectable gutter which serves for the removal of the waste water. On the surface of this floor as well as in the anterooms is placed a light wooden grating.

The heating of the floor of the internal corridor is accomplished by eight iron stoves, in form, Brink says, "like a bottle lying down," the stove pipes being laid under the grated floor and led out finally through asbestos-lined openings in the roof of the tent, as are similarly the smoke chimneys of the disinfecting and laundry apparatus which assist in heating the anterooms.

The internal corridor receives the major part of the heating of its air space from the apparatus of the outer corridor just mentioned, and from the bathing tent, heated by the water heater. This is usually what is described in the technological dictionaries as a transportable water-tube boiler, though this can, when necessary, be replaced by the traveling kitchen. The water is carried in specially devised folding canvas receptacles of large dimensions, each of which is mounted on a cart. Galvanized iron tubs are used for bathing, a suitable method of installing showers, though a very desirable improvement, not yet having been devised. Experience has shown that quite adequate

temperatures are thus obtained, even in winter.

The barber shop is provided with American hair-clipping machines and with hair collectors, which are bags hung around the necks of the individuals whose hair is being cut.

At the entrance to the anteroom of the disrobing chamber, a pavilion is attached to the main tent for the soldiers awaiting their turn to bathe. A similar pavilion has been attached at the exit from the anteroom of the dressing chamber, equipped by one of the Russian aid societies, and used as a tea-restaurant.

The train of the traveling bath as above outlined consists of twenty-four two-wheeled carts, six four-wheeled wagons, one traveling kitchen and three wagons for the tea-restaurant equipment.

The soldiers enter the undressing room in parties of ten to twenty; they disrobe and place their soiled clothing in numbered sacks, which are put through the disinfecting apparatus. They then go into the barber shop, where the hair is clipped close. Before he enters the bathing apartment, each man receives a sterilized bast-wisp and some naphtha soap. After bathing, they go into the dressing room and are given each a clean towel, clean linen and their disinfected and dried clothing. The bath can be put up and made ready to operate in three to four hours, and in case of alarm, can be dismantled and removed, without interfering with

the troops, in less than an hour. It has not attracted the attention of aeroplanes. The disappearance of insects from the companies has been noted for several weeks at a time after the use by them of this method.

A Russian regiment of 4,000 to 4,500 men can be bathed in one and one-half to two days by this method, whereas in the hut method it could not be done in a week. The latter also takes at least twenty-four hours to install. Over the railway bath it has the advantage of mobility and the possibility of being sometimes pushed within a few kilometers of the firing line.

IV. A plan more modest and easier to realize than those just described is that of the *demountable transportable shower baths* of the French Service of Co-ordinations of Voluntary Aid for Soldiers.

This apparatus, once installed and started going, functions automatically.

It consists of a small boiler, accompanied by a fire box. The boiler has installed above it a reservoir of galvanized sheet iron of 120 liters capacity, and the water runs from it, through a metallic pipe, into the lower part of the boiler, where it comes into close contact with the fire box and thus is heated rapidly. A second pipe runs from the top part of the boiler into the reservoir at about the middle of its height, and the vapor thus introduced into the latter aids in the rapid elevation of the temperature of the water. Finally, a third pipe, provided with a

stopcock, and attached to a system of smaller pipes disposed horizontally, conducts the warm water to the sprinklers of the shower baths, in number four, six or eight, according to the model of apparatus chosen.

The functioning of the apparatus is most simple. About ten minutes after lighting the fire the water reaches a temperature of 37 to 40° C., and if the reservoir is then fed with cold water to maintain a constant level, a continuous flow of water at a constant temperature is fed to all the sprinklers. A grating placed directly under the shower, with a bench placed a little behind it for the undressing of the men, completes the installation.

It serves for from 250 to 500 bathers per working day of six hours, according to the number of showers installed. It is demountable, weighs about 150 kilograms, and can be carried in four packages of small dimensions. It costs about one hundred dollars, and is said to have been used with great satisfaction by numerous French regiments. The disadvantages are the comparatively small capacity and the difficulty of adaptation to winter conditions.

V. *The Bath Train.* — The Russian trains consist each of a score of made-over baggage cars drawn by a locomotive. At the head of the train are two tank cars containing water enough for twenty-four hours' work, heated to a suitable temperature by means of a supplementary boiler installed on the locomotive, which is also furnished with a steam pump for supplying the showers. Pumps are also installed on the tank car for supplying them with water, though the water is usually taken on from tanks at the railroad stations. Of the following cars, the next is used for undressing, the soiled clothing and linen being placed in bags for disinfection. Thence the soldiers, after being furnished soap and bast-wisps, pass into the three bath cars following *en suite*, each divided into about twenty small alcoves by sheet iron partitions for the hot baths and succeeding cold showers. Arrangements for vapor baths may be made in the central parts of the cars. Under the floors of the bathing cars there are placed suitable collectors to hold the waste water. There next follow two cars provided with couches, where the men are allowed to recline for a suitable time after the bath, and then two restaurant cars, in which they receive a substantial meal. The men then enter the next car, where they receive clean linen and their clothing, which has been previously mended, disinfected and dried. They are now, as Vitoux says, "fresh and disposed to return to the combat." As to the remaining cars, they are arranged to serve for disinfecting, for a drying room, for cooking, for lodging the personnel employed on the train, and as storerooms for linen and provi-

sions. One car is used as a shoemaker shop and another as a mending room. There may be added a barber shop for cutting the hair. All the cars are heated by the locomotive by means of special tubing and joined together by warmth-conserving vestibule bellows. The cars are paneled with felt, cork and wood, to keep them warm. Arrangements for the electric lighting of the train can be made without great difficulty or expense, if desired.

Each train is capable of bathing, disinfecting and feeding from two to three thousand soldiers daily. The cost of the train, not counting the locomotive, is about $50,000, and the cost of maintenance, excluding new linen, $5,000 per month.

This scheme really looks like a counsel of perfection, and I must confess to some scepticism about it. However, as I said, the thing is vouched for on the testimony of a reliable French author.

It would be extremely interesting to learn the methods used by the Germans in bathing their soldiers in this war. Knowing their proverbial thoroughness of detail, it is to be inferred that they have devised methods that adequately handle the situation.

It is unfortunate that, owing to the lack of reliable mail communications between Germany and this country, and to other reasons, we have not had access to their medical literature for nearly two

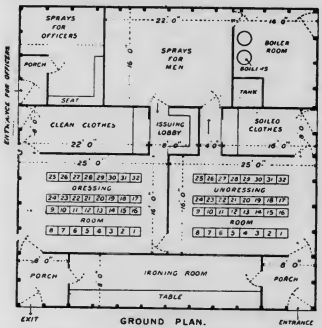
years past. The following translation of a paragraph in the *Psikhiatricheskaya Gazeta*, Petrograd, of November 15, 1915, page 376, is enlightening in this connection and as a testimony of the vaunted Teutonic Kultur:

"By order of the Prussian Ministry of War, publishers of periodicals and other publications appertaining to medicine are prohibited from sending them abroad, even into neutral countries, be these journals, pamphlets or books on that specialty, in order to prevent physicians from using methods of treatment discovered since war operations had begun."

I find that Dr. Rudolf Rauch, in the *Berliner klinische Wochenschrift* for May 17, 1915, describes a *proposed* railway bathing train. In a general way, the arrangements are similar to those of the Russian train described above, so it is unnecessary to go into detail concerning it. Suffice it to say, that it is cheaper of construction and simpler than the Russian train, so that in a train of the same dimensions it is estimated that 13,000 baths can be given daily, or even 26,000 if the bathing time is reduced.

VI. In the *Journal of the Royal Army Medical Corps* for September, 1916, are described the latest English methods of bathing soldiers in the field. Captain H. Norman Goode outlines the plans of a divisional bath now used in one of the model British divisions. He speaks of the great difficulty of maintaining sanitary conditions in the trenches, especially with reference to the prevalence there of

the so-called clothes or body louse, *Pediculus vestimentorum*, and the consequent necessity of baths and changes of the underclothing of the soldiers as soon as they come out of the trenches. In the installation that Captain Goode has devised the



baths are contained in a portable frame building, presented by one of the British Aid Societies. In ground plan this building consists of large undressing and dressing rooms, a bath room with eight showers, an officers' shower bath, a room for soiled underclothing and a storehouse for clean linen, a boiler room and an ironing room where the khaki clothing is

gone over with hot irons to destroy the lice, and where Thresh disinfectors for soiled linen are also installed.

The arrangement of these rooms is such as to conserve one of the main principles underlying all processes of disinfection; that is, to keep soiled and clean parts entirely separate.

"The water is pumped by means of a little petrol (gasoline) engine into a 1,600-gallon tank, twenty-four feet high. Thence it runs by gravity to the two connected tanks which feed the boilers, which are independent of one another. The water—hot, cold, or mixed hot and cold—feeds the light sprays by gravity, sprays being used to economize water, since only one and one-half to two gallons are required per man instead of six when using tubs."

At first water was carried to the bath in a motor tank from the nearest stream, often a mile or two away, but as a later development methods were devised of obtaining water locally; rain water is now collected off the roof, a shallow well has been dug, and a process has been invented and installed for disinfecting the sullage water and using it over and over again. All these sources of supply are connected up with the motor pump.

The procedure of going through the baths is practically the same as that in the methods previously described, and two thousand men can be bathed daily, allowing each man three minutes under the shower. The disinfected clothing is transported on wagons to a village some miles away, where it is washed and mended by

hired washerwomen and returned to the camp a day or two later. There is necessarily some wastage in this process, and the method of course requires large stores of clean linen at the bathing plant, to be issued to the soldiers after their bath.

The method devised, after experimentation, by Captains Goode and Hughs, for disinfecting and cleaning the water draining from the baths so that it may be used over again, is quite ingenious. Briefly, it is as follows:

The soapy bath water is run into a mixing tank, where it is thoroughly mixed with slaked lime, which precipitates the soap as insoluble calcium stearates, also the dirt and impurities. The effluent thence flows through three settling tanks arranged in longitudinal series with partitions of framework covered with canvas, in the third of which washing soda is added, which precipitates the calcium salts and separates out the soluble oils from the soap. These oils float on the surface, whence they can be mechanically removed by canvas or sacking, nailed on wooden frames. From the third tank the water is run into a charcoal filter when, after filtration, it flows into a well and is then pumped into the supply tank. The tanks are, of course, periodically cleaned out and the removed sludge is buried.

The inventor states this system "is characterized by its easy method of construction, its simplicity and mobility. It has now been working for several months

and its results have proved satisfactory in every way. I can strongly recommend this method as highly suitable when large numbers of men have to be dealt with, and more especially in those places where water is scarce."

Indeed, it seems that outside of the baths *de luxe* of the Russians — the traveling bath trains—which are necessarily limited in application to cases where the camps are conveniently situated with reference to railway lines, this British method offers us the best system yet devised for bathing troops *en masse*.

In this connection it seems worth recording that Lieutenant-Colonel Copeman, of the British Army, has described a new method of handling the difficult problem of the management of waste water from bathing establishments, which consists in treating it with an otherwise valueless by-product of explosive factories. This is nitre-cake, which is chemically a crude acid sodium sulphate, of which hundreds of thousands of pounds are produced weekly.

Finally, leaving the collective methods, I would note the *individual camping douche* devised in France by M. Mantelet. This is applicable only on a small scale, but is suitable at least for officers. It weighs only a few hundred grammes and consists of a sort of sack made of impermeable cloth and of a capacity of about twelve liters. It has at its base a sprinkler with obturating valve, which is

operated by an attached chain. The apparatus may be filled with water and suspended on a beam or ladder, or the branch of a tree. It is really complete and practical, so far as its operation can be made to extend.

I sincerely hope that the outline given, while very incomplete, owing to the present impossibility of more thorough examination of the war literature, will afford ideas which may give us a working basis for our efforts in relation to this most important subject of the personal hygiene of the soldier, which no doubt will ere long occupy largely the attention of our sanitarians, both civil and military.

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TITLE